

**Table F-11. 5-year relative survival by age and race for endometrial cancer**

| Race and Age |                             | Percent Surviving at End of Interval |         |         |         |         |
|--------------|-----------------------------|--------------------------------------|---------|---------|---------|---------|
| <i>White</i> |                             |                                      |         |         |         |         |
| <i>Age</i>   | Number at Start of Followup | 1 year                               | 2 years | 3 years | 4 years | 5 years |
| 0-44         | 1,271                       | 97.60%                               | 94.90%  | 93.80%  | 92.40%  | 91.70%  |
| 45-45        | 3,571                       | 96.40%                               | 94.40%  | 92.50%  | 91.40%  | 90.10%  |
| 55-64        | 5,719                       | 96.10%                               | 93.30%  | 91.00%  | 89.50%  | 89.10%  |
| 65-74        | 4,007                       | 94.00%                               | 89.70%  | 87.20%  | 85.60%  | 83.90%  |
| 75+          | 3,606                       | 0.40%                                | 0.60%   | 0.70%   | 0.70%   | 0.90%   |
| <i>Black</i> |                             |                                      |         |         |         |         |
| <i>Age</i>   |                             |                                      |         |         |         |         |
| 0-44         | 226                         | 86.80%                               | 80.70%  | 76.90%  | 74.70%  | 73.90%  |
| 45-45        | 309                         | 90.40%                               | 84.30%  | 80.00%  | 76.20%  | 74.70%  |
| 55-64        | 538                         | 84.90%                               | 76.50%  | 69.90%  | 67.30%  | 66.50%  |
| 65-74        | 470                         | 86.50%                               | 75.70%  | 71.00%  | 64.70%  | 63.40%  |
| 75+          | 269                         | 70.50%                               | 58.40%  | 49.80%  | 49.00%  | 46.40%  |

**Vascular events: Deep venous thrombosis, pulmonary embolus, stroke, myocardial infarction.** As with cancer, age- and race-specific incidences for these states are adjusted for OC use status as described below. Other key assumptions:

- Women who experience one of these events while on OCs will not use OCs afterwards.
- For women under the age of 65, the best population-level data for estimating both incidence and mortality is hospital discharge data. This may underestimate incidence by missing cases that are diagnosed and managed completely as outpatients, and underestimate mortality by missing postdischarge deaths.

**Allowed transitions:** Condition-specific mortality, survivor, cancers, other acute complications

Estimates of admissions for women by age and race/ethnicity were generated using the Nationwide Inpatient Sample (NIS) dataset from 2000 to 2007, a publicly available survey of a mix of community hospital inpatient settings that surveys diagnoses, procedures, length of stay, and costs associated with approximately 20 percent of all U.S. inpatient discharges (<http://www.hcup-us.ahrq.gov/nisoverview.jsp>).

Discharges within the NIS data were used to estimate national numbers of admissions for the vascular events of interest, using ICD-9 diagnosis codes, specifically acute myocardial infarction (410.x), pulmonary embolus (415.1), stroke (430.x, 431.x, 432.x, 434.x) and DVT (453.x). Estimates were weighted using available survey weights and subset into mutually exclusive categories comprised of 5-year age groups (15–85+) and race/ethnicity categories (white, black, Hispanic, other).

Hospital admission probabilities were estimated by using the point estimate and standard errors to generate gamma distributions (bounded by 0 at the lower end) for the annual number of admissions. During the simulations, the probability was calculated by drawing a number from the gamma distribution, dividing this number by the total number of women in a given age and race/ethnicity stratum and converting the rate to a probability.

We present only point estimates here—the standard errors used to generate the gamma distributions are available from the authors.

**Table F-12. Annual admissions for deep venous thrombosis by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 678            | 210   | 125      | 25    |
| 20-24     | 1320           | 577   | 253      | 70    |
| 25-29     | 1813           | 928   | 499      | 198   |
| 30-34     | 2359           | 1292  | 617      | 215   |
| 35-39     | 3159           | 1687  | 747      | 250   |
| 40-44     | 4914           | 2529  | 874      | 339   |
| 45-49     | 6373           | 2955  | 1086     | 486   |
| 50-54     | 7330           | 2794  | 1132     | 630   |
| 55-59     | 8443           | 3008  | 1280     | 704   |
| 60-64     | 10024          | 3167  | 1225     | 692   |
| 65-69     | 11163          | 3127  | 1350     | 817   |
| 70-74     | 13111          | 3560  | 1405     | 964   |
| 75-79     | 16762          | 3206  | 1603     | 937   |
| 80-85     | 18656          | 2918  | 1444     | 1106  |
| 85+       | 24442          | 3645  | 1658     | 1218  |

**Table F-13. Annual admissions for pulmonary embolism by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 448            | 127   | 56       | 35    |
| 20-24     | 1020           | 417   | 148      | 45    |
| 25-29     | 1315           | 622   | 226      | 86    |
| 30-34     | 1758           | 840   | 233      | 183   |
| 35-39     | 1957           | 1296  | 329      | 143   |
| 40-44     | 3014           | 1472  | 484      | 225   |
| 45-49     | 4150           | 1476  | 486      | 268   |
| 50-54     | 4804           | 1394  | 449      | 299   |
| 55-59     | 5688           | 1458  | 479      | 393   |
| 60-64     | 6406           | 1340  | 522      | 345   |
| 65-69     | 7582           | 1631  | 576      | 437   |
| 70-74     | 8532           | 1782  | 616      | 394   |
| 75-79     | 10044          | 1655  | 646      | 490   |
| 80-85     | 9954           | 1338  | 594      | 475   |
| 85+       | 10793          | 1368  | 624      | 349   |

**Table F-14. Annual admissions for stroke by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 158            | 104   | 76       | 37    |
| 20-24     | 211            | 112   | 121      | 71    |
| 25-29     | 302            | 180   | 126      | 53    |
| 30-34     | 555            | 312   | 209      | 144   |
| 35-39     | 831            | 446   | 279      | 180   |
| 40-44     | 1906           | 765   | 389      | 301   |
| 45-49     | 3348           | 1398  | 643      | 358   |
| 50-54     | 5930           | 2035  | 909      | 555   |
| 55-59     | 8452           | 1878  | 1054     | 790   |
| 60-64     | 13234          | 1986  | 1402     | 910   |
| 65-69     | 17362          | 2699  | 1419     | 1199  |
| 70-74     | 21758          | 2468  | 1903     | 1542  |
| 75-79     | 27856          | 2821  | 1796     | 1708  |
| 80-85     | 29142          | 2384  | 1423     | 1572  |
| 85+       | 31688          | 2416  | 1247     | 1725  |

**Table F-15. Annual admissions for acute myocardial infarction by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 37             | 5     | 3        | 0     |
| 20-24     | 120            | 64    | 42       | 10    |
| 25-29     | 259            | 204   | 57       | 15    |
| 30-34     | 606            | 446   | 132      | 58    |
| 35-39     | 1472           | 567   | 194      | 134   |
| 40-44     | 3297           | 1169  | 524      | 389   |
| 45-49     | 6388           | 2155  | 872      | 617   |
| 50-54     | 9631           | 3034  | 1280     | 912   |
| 55-59     | 13318          | 3374  | 1774     | 1243  |
| 60-64     | 18156          | 3552  | 1979     | 1329  |
| 65-69     | 20389          | 3720  | 2310     | 1985  |
| 70-74     | 24600          | 4162  | 2365     | 1973  |
| 75-79     | 31846          | 4013  | 2733     | 2298  |
| 80-85     | 37194          | 3768  | 2392     | 2480  |
| 85+       | 58620          | 4883  | 2690     | 3046  |

Mortality for each event was estimated using the number of patients in a given age/race stratum in the NIS with each diagnosis who had a discharge status of “death,” together with the total number of admissions within a given diagnosis/age/race stratum, to generate beta distributions for the conditional probability of death given the occurrence of the event. We assumed all deaths occurred during the same cycle as the event.

**Table F-16. Annual deaths during hospitalization for deep venous thrombosis by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 8              | 3     | 0        | 0     |
| 20-24     | 10             | 5     | 9        | 5     |
| 25-29     | 21             | 11    | 10       | 0     |
| 30-34     | 47             | 9     | 19       | 10    |
| 35-39     | 54             | 44    | 47       | 10    |
| 40-44     | 92             | 45    | 18       | 10    |
| 45-49     | 140            | 120   | 42       | 20    |
| 50-54     | 296            | 111   | 50       | 48    |
| 55-59     | 405            | 139   | 72       | 36    |
| 60-64     | 444            | 194   | 79       | 55    |
| 65-69     | 629            | 156   | 54       | 63    |
| 70-74     | 816            | 212   | 64       | 76    |
| 75-79     | 1136           | 186   | 145      | 57    |
| 80-85     | 1081           | 194   | 96       | 117   |
| 85+       | 1686           | 297   | 139      | 77    |

**Table F-17. Annual deaths during hospitalization for pulmonary embolism by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 5              | 0     | 0        | 5     |
| 20-24     | 20             | 14    | 9        | 0     |
| 25-29     | 15             | 16    | 10       | 5     |
| 30-34     | 26             | 10    | 14       | 10    |
| 35-39     | 30             | 61    | 21       | 5     |
| 40-44     | 87             | 69    | 44       | 5     |
| 45-49     | 145            | 119   | 30       | 10    |
| 50-54     | 354            | 106   | 13       | 37    |
| 55-59     | 347            | 115   | 45       | 26    |
| 60-64     | 521            | 170   | 89       | 43    |
| 65-69     | 618            | 114   | 33       | 55    |
| 70-74     | 723            | 158   | 50       | 30    |
| 75-79     | 811            | 140   | 88       | 56    |
| 80-85     | 907            | 105   | 42       | 50    |
| 85+       | 1225           | 176   | 85       | 59    |

**Table F-18. Annual deaths during hospitalization for stroke by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 39             | 15    | 0        | 0     |
| 20-24     | 14             | 10    | 14       | 15    |
| 25-29     | 38             | 25    | 5        | 8     |
| 30-34     | 34             | 55    | 24       | 0     |
| 35-39     | 154            | 77    | 37       | 9     |
| 40-44     | 216            | 137   | 47       | 42    |
| 45-49     | 285            | 177   | 81       | 48    |
| 50-54     | 474            | 250   | 133      | 66    |
| 55-59     | 539            | 203   | 123      | 96    |
| 60-64     | 683            | 172   | 110      | 131   |
| 65-69     | 793            | 274   | 99       | 87    |
| 70-74     | 1148           | 177   | 171      | 160   |
| 75-79     | 1491           | 292   | 165      | 201   |
| 80-85     | 2096           | 232   | 143      | 185   |
| 85+       | 2992           | 329   | 175      | 221   |

**Table F-19. Annual deaths during hospitalization for myocardial infarction by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 13             | 0     | 0        | 0     |
| 20-24     | 10             | 5     | 0        | 4     |
| 25-29     | 15             | 10    | 9        | 0     |
| 30-34     | 31             | 24    | 19       | 0     |
| 35-39     | 69             | 57    | 5        | 10    |
| 40-44     | 132            | 76    | 32       | 6     |
| 45-49     | 244            | 155   | 51       | 36    |
| 50-54     | 519            | 166   | 60       | 44    |
| 55-59     | 834            | 232   | 169      | 71    |
| 60-64     | 1235           | 334   | 164      | 84    |
| 65-69     | 1574           | 378   | 179      | 167   |
| 70-74     | 2359           | 410   | 203      | 246   |
| 75-79     | 3595           | 447   | 337      | 289   |
| 80-85     | 4892           | 504   | 391      | 328   |
| 85+       | 9507           | 803   | 502      | 463   |

**Surgical removal of pelvic organs—hysterectomy and/or oophorectomy.** Removal of the organ at risk eliminates the probability of developing cancer in that organ, and there is some evidence that removal of the uterus reduces ovarian cancer risk even if the ovaries are preserved. Because hysterectomy is performed for a variety of indications, often with removal of the ovaries, and is quite common in the U.S. (with up to 30% of women undergoing hysterectomy by age 65), we incorporated age- and race-specific hysterectomy and oophorectomy rates for

conditions other than cancers of the pelvic organs into the model, and adjusted probabilities for cancer development accordingly. We assumed the following:

- The probability of hysterectomy and/or oophorectomy is independent of OC use. Because OCs may reduce the risk of some conditions such as endometriosis which are common indications for hysterectomy, this may not be the case.
- These procedures are increasing being done on an outpatient basis; relying on discharge data may underestimate the rates.

Estimates were again derived from the NIS, excluding women with a diagnosis of any cancer of the cervix (180.x), uterus (182.x), or ovary (183.x). ICD-9 procedural codes were used to identify hysterectomy alone (68.4x, 68.5x, 68.9x), and with either bilateral (65.5x, 65.6x) or unilateral (65.3x, 65.4x) oophorectomy. Unilateral and bilateral oophorectomy without hysterectomy were also included. As with vascular event hospitalizations, we used point estimates and standard errors to generate gamma distributions, which in turn provided the numerator for estimating age- and race/ethnicity-specific probabilities.

**Table F-20. Annual hospitalizations for hysterectomy alone by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 25             | 6     | 24       | 0     |
| 20-24     | 714            | 108   | 122      | 49    |
| 25-29     | 4002           | 634   | 482      | 146   |
| 30-34     | 8491           | 1902  | 1702     | 621   |
| 35-39     | 15776          | 4940  | 3920     | 1177  |
| 40-44     | 20735          | 7021  | 5494     | 2251  |
| 45-49     | 15636          | 4261  | 3401     | 1645  |
| 50-54     | 6093           | 970   | 1074     | 514   |
| 55-59     | 3002           | 198   | 534      | 205   |
| 60-64     | 2718           | 149   | 367      | 217   |
| 65-69     | 2545           | 108   | 413      | 198   |
| 70-74     | 2056           | 104   | 239      | 185   |
| 75-79     | 1753           | 52    | 152      | 85    |
| 80-85     | 864            | 11    | 64       | 40    |
| 85+       | 206            | 37    | 4        | 4     |

**Table F-21. Annual hospitalizations for hysterectomy with unilateral oophorectomy by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 5              | 0     | 6        | 0     |
| 20-24     | 149            | 10    | 5        | 11    |
| 25-29     | 743            | 86    | 68       | 44    |
| 30-34     | 1786           | 373   | 245      | 90    |
| 35-39     | 3235           | 951   | 704      | 250   |
| 40-44     | 4616           | 1448  | 956      | 353   |
| 45-49     | 3749           | 1137  | 760      | 460   |
| 50-54     | 1332           | 308   | 200      | 126   |
| 55-59     | 489            | 84    | 76       | 59    |
| 60-64     | 391            | 25    | 56       | 22    |
| 65-69     | 286            | 15    | 38       | 48    |
| 70-74     | 285            | 10    | 18       | 9     |
| 75-79     | 112            | 11    | 38       | 11    |
| 80-85     | 108            | 0     | 9        | 8     |
| 85+       | 30             | 0     | 5        | 0     |

**Table F-22. Annual hospitalizations for hysterectomy with bilateral oophorectomy by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 23             | 0     | 5        | 0     |
| 20-24     | 271            | 24    | 16       | 9     |
| 25-29     | 1735           | 175   | 121      | 98    |
| 30-34     | 4125           | 494   | 316      | 190   |
| 35-39     | 7284           | 1208  | 813      | 465   |
| 40-44     | 15616          | 2885  | 2084     | 1200  |
| 45-49     | 24673          | 5260  | 3907     | 2450  |
| 50-54     | 17672          | 3307  | 2420     | 1760  |
| 55-59     | 8733           | 1052  | 1089     | 739   |
| 60-64     | 5847           | 723   | 705      | 413   |
| 65-69     | 4438           | 402   | 519      | 344   |
| 70-74     | 2644           | 244   | 317      | 238   |
| 75-79     | 1859           | 142   | 196      | 180   |
| 80-85     | 993            | 63    | 49       | 46    |
| 85+       | 507            | 52    | 43       | 14    |

**Table F-23. Annual hospitalizations for unilateral oophorectomy alone by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 5463           | 1904  | 1950     | 687   |
| 20-24     | 10375          | 3427  | 3351     | 1243  |
| 25-29     | 17637          | 5439  | 4719     | 2273  |
| 30-34     | 25214          | 7276  | 6309     | 3143  |
| 35-39     | 32831          | 9368  | 6856     | 3604  |
| 40-44     | 34752          | 9753  | 6658     | 4054  |
| 45-49     | 25178          | 6270  | 4215     | 2605  |
| 50-54     | 12685          | 2130  | 1465     | 1070  |
| 55-59     | 8212           | 1123  | 788      | 456   |
| 60-64     | 6798           | 879   | 659      | 293   |
| 65-69     | 6914           | 638   | 618      | 384   |
| 70-74     | 7135           | 593   | 470      | 341   |
| 75-79     | 6949           | 560   | 382      | 288   |
| 80-85     | 5161           | 291   | 235      | 150   |
| 85+       | 3865           | 193   | 155      | 118   |

**Table F-24. Annual hospitalizations for bilateral oophorectomy alone by age and race/ethnicity for U.S. females**

| Age Group | Race/Ethnicity |       |          |       |
|-----------|----------------|-------|----------|-------|
|           | White          | Black | Hispanic | Other |
| 15-19     | 149            | 34    | 49       | 24    |
| 20-24     | 859            | 140   | 151      | 71    |
| 25-29     | 3819           | 645   | 483      | 204   |
| 30-34     | 9314           | 2026  | 1179     | 536   |
| 35-39     | 17836          | 4083  | 2461     | 1165  |
| 40-44     | 31852          | 7904  | 4411     | 2315  |
| 45-49     | 43168          | 9786  | 5895     | 4124  |
| 50-54     | 33232          | 5858  | 3512     | 2399  |
| 55-59     | 21266          | 2267  | 1717     | 1327  |
| 60-64     | 17005          | 1460  | 1258     | 819   |
| 65-69     | 15796          | 1270  | 1117     | 711   |
| 70-74     | 13198          | 672   | 808      | 639   |
| 75-79     | 10171          | 463   | 548      | 465   |
| 80-85     | 5990           | 286   | 283      | 194   |
| 85+       | 3048           | 104   | 126      | 163   |

## Reproductive States

**Menopause.** We used published data to generate conditional probabilities of natural menopause by age.<sup>3</sup> Although the paper by Gold et al. found some differences in menopause probabilities by race and ethnicity, hazard ratios included 1, and we elected to model only age-specific probabilities. We assumed that women undergoing bilateral oophorectomy with or without hysterectomy, as well as women receiving definitive treatment for gynecologic cancers, were menopausal. We did not adjust menopausal probabilities in women who had undergone hysterectomy with ovarian preservation. We assumed that no woman underwent nonsurgical menopause prior to age 41, and all women had undergone menopause by age 55.

**Table F-25. Conditional probability of natural menopause by age**

| Age   | Conditional Probability |
|-------|-------------------------|
| 15-40 | 0.00%                   |
| 41    | 1.02%                   |
| 42    | 1.03%                   |
| 43    | 1.04%                   |
| 44    | 1.05%                   |
| 45    | 2.15%                   |
| 46    | 4.49%                   |
| 47    | 4.71%                   |
| 48    | 11.84%                  |
| 49    | 11.76%                  |
| 50    | 23.64%                  |
| 51    | 37.50%                  |
| 52    | 60.00%                  |
| 53    | 66.67%                  |
| 54    | 100.00%                 |

**Allowed transitions:** Other cause mortality, cancers, acute complications

**Probability of contraceptive use.** Estimates of contraception use were generated using the National Survey of Family Growth (NSFG) 2002 and 2006 to 2010 data sets. The NSFG is a survey conducted by the Centers for Disease control that gathers information on family life, marriage and divorce, pregnancy, infertility, use of contraception, and men's and women's health (<http://www.cdc.gov/nchs/nsfg.htm>), and supplemented with the literature as needed.

Estimates of national female contraception prevalence rates and accompanying standard deviations were generated using the NSFG dataset. All estimates were subset by age, race, and prior pregnancy/birth status distribution and were weighted to generate national-level estimates. Survey data was limited to women aged 15 to 44 and excluded women pregnant at the time of the survey. All other women were included. Total survey weights reflected 59 million women aged 15 to 44. Subset analysis was performed by creating several mutually exclusive categories. Age was analyzed by categorizing patients into 5-year age groups (6 groups total); race/ethnicity as white, black, Hispanic, or other; and prior birth and pregnancy status as never pregnant, pregnant with no live births, one live birth, two live births, or more than two live births. For each of these groups, estimates were for the following contraception categories:

1. Female sterilization
2. Male sterilization
3. OCs
4. Other hormonal methods (Norplant or Implanon implant, Lunelle (injectable), Depo-Provera (injectable), contraceptive patch, contraceptive ring, morning-after pill)
5. IUD
6. Barrier methods (diaphragm with or without jelly or cream, male condom, foam, Today sponge, suppository or insert, jelly or cream without diaphragm)
7. Periodic abstinence (NFP, cervical mucus test or temperature rhythm, calendar rhythm)
8. No method (withdrawal, other method, other nonuser—had intercourse in the 3 months prior to interview)
9. Not sexually active (other nonuser—never had intercourse since first period, other nonuser—has had intercourse but not in the 3 months prior to interview)
10. Other not at risk (pregnant; seeking pregnancy; postpartum; sterile-nonsurgical, female; sterile-nonsurgical, male; sterile-surgical, female noncontraceptive; sterile-surgical, male noncontraceptive; sterile-unknown reasons, male)

For the purposes of this analysis, we categorized contraceptive methods as oral contraceptives, female sterilization, and all others (including nonuse).

**Age at first use of OCs.** We used age-specific prevalences from the NSFG to generate conditional probabilities of use by age and race/ethnicity.

**Table F-26. Conditional probability of oral contraceptive use by age and race/ethnicity**

| Age Group | Race/Ethnicity |        |          |        |
|-----------|----------------|--------|----------|--------|
|           | White          | Black  | Hispanic | Other  |
| 10-14     | 11.45%         | 21.82% | 5.62%    | 5.62%  |
| 15-19     | 24.03%         | 14.37% | 12.98%   | 29.06% |
| 20-24     | 50.29%         | 29.86% | 46.91%   | 28.05% |
| 25-29     | 37.40%         | 32.34% | 22.38%   | 34.04% |
| 30-34     | 22.63%         | 5.58%  | 22.98%   | 21.31% |
| 35-39     | 4.88%          | 12.80% | 14.75%   | 37.19% |
| 40        | 0              | 0      | 0        | 0      |

**Duration of use.** We found only one study which provided data to generate distributions for duration of use,<sup>4</sup> which reported a mean of 54.8 months with a standard deviation of 41 months. We used these to generate a gamma distribution, with a range of 1-308 months, 10<sup>th</sup> percentile of 13 months, 50<sup>th</sup> percentile of 45 months, and 90<sup>th</sup> percentile of 110 months.

**Age-specific probability of tubal ligation.** We used published estimates of the number of procedures by age and race/ethnicity, along with the total number of women in each stratum, to generate beta distributions for the probability of tubal ligation.

**Table F-27. Conditional probability of oral contraceptive use by age and race/ethnicity**

| Age Group | Race/Ethnicity |        |          |        |
|-----------|----------------|--------|----------|--------|
|           | White          | Black  | Hispanic | Other  |
| 15-19     | 0              | 0      | 3083     | 3591   |
| 20-24     | 74769          | 40201  | 29260    | 22458  |
| 25-29     | 670855         | 155335 | 125356   | 66347  |
| 30-34     | 408671         | 223174 | 346754   | 102707 |
| 35-39     | 401060         | 114853 | 139134   | 655    |
| 40-44     | 486188         | 255996 | 273579   | 87172  |

## Model Predictions Compared With SEER Estimates

Table F-28 compares mean predicted lifetime cancer incidence and mortality from age 10 to 100 for a 60,000-iteration simulation of our “base-case” model, where the effects of OC use on age- and race-specific incidence are modeled based on “ever/never” status and population-level estimates of patterns of OC use, and cancer-specific mortality is modeled as age- and race-specific post-diagnosis survival, to estimates for lifetime incidence and mortality from age 10 through 100 derived from the SEER DevCan Program (<http://surveillance.cancer.gov/devcan/>). DevCan models overall incidence using the same SEER datasets used for the model, but mortality estimates are independently derived based on death certificate data reported to the National Center for Health Statistics.

**Table F-28. Model predictions compared with SEER estimates**

| Cancer Type        | Lifetime Incidence |       | Lifetime Mortality                 |                            |
|--------------------|--------------------|-------|------------------------------------|----------------------------|
|                    | SEER DevCan        | Model | SEER DevCan<br>(Death Certificate) | Model<br>(Incidence-based) |
| Ovarian cancer     | 1.37%              | 1.40% | 1.98%                              | 0.78%                      |
| Breast cancer      | 12.51%             | 11.0% | 2.8%                               | 0.98%                      |
| Cervical cancer    | 0.69%              | 0.63% | 0.24%                              | 0.01%                      |
| Colorectal cancer  | 4.83%              | 4.7%  | 1.98%                              | 1.57%                      |
| Endometrial cancer | 2.67%              | 2.1%  | 0.55%                              | 0.41%                      |

Lifetime incidence estimates—which in both our model and DevCan are based on the same age- and race-specific incidences and competing risks—are quite similar, providing some validation of the estimates of relative risk conditional on OC use used in the model and our underlying structural assumptions. The model-derived mortality estimates, which are independent of OC use and are based on age- and race-specific (black/white only) conditional survivals, are consistently lower than the DevCan estimates, which are derived from death certificate data. This is consistent with other “incidence-based mortality” models, where overall mortality estimates are derived from specific survival functions based on patient or tumor characteristics.<sup>5,6</sup> There are multiple possible explanations for this, including (1) the effect of competing risks for other cause mortality within the model after diagnosis, (2) age/period/cohort effects in the death certificate data that are not reflected in the model estimates, (3) the fact that SEER incidence and survival data represent a sample of the population, while the mortality data are derived from the entire population, and (4) inadequate modeling of mortality more than 5 years after survival (particularly for breast cancer). Since the potential underestimation of mortality affects both potential harms of OC use (breast and cervical cancer) and benefits (ovarian, endometrial, colorectal), the net effect on the overall balance of mortality harm and benefit is unclear—but is clearly worthy of further exploration.

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